A Practical Return to Play Framework for Lower Limb Injuries in Professional Soccer

Enrique A. Martínez-Ruiz, [1] **Sean Edmond-Buckley,** [2] **Silas Waszczuk** [3]

[1]Performance Department, Inter Miami CF, Fort Lauderdale, FL, USA
[2]Performance & Reconditioning Department, Club América, Mexico City, Mexico
[3]Rehabilitation and Physical Therapy Department, Inter Miami CF, Fort Lauderdale, FL, USA

On-field rehabilitation | Load management | Strength-power progression | HIIT prescription | Sport-specific exposure | Decision making

Headline

Lower-limb injuries represent more than 80% of time-loss cases in professional soccer (1–4), underscoring the need for structured, criterion-based return-to-play (RTP) processes that integrate medical, functional, and performance considerations. We outline a practical interdisciplinary framework combining functional rehabilitation, load management, and soccer-specific performance development (5–10). Our model provides clearly defined phases, objective progression criteria, and applied guidance to support consistent decision-making, enhance communication across departments, and reduce reinjury risk in elite football environments.

Aim of the Paper

Practice-derived framework informed by interdisciplinary RTP workflows in elite professional football; we did not collect human participant data.

Design

Technical note (practice-derived framework); no experimental data were collected.

Methods

Practice-derived framework; no human participant data were collected.

Results

Framework outputs are presented in Figure 1 and Tables 1-5.

Framework Overview

Lower limb injuries remain the most prevalent and performance limiting conditions in professional soccer due to the sport's intermittent, high intensity demands, including repeated accelerations, decelerations, sprints, and multidirectional movements (1–4). These actions impose substantial mechanical and neuromuscular stress on the lower extremities. Epidemiological data show that over 80% of soccer related injuries affect the lower limbs, with hamstring, quadriceps, and adductor strains representing a large proportion of time loss cases, recurrent episodes, and reduced player availability throughout the season (4–6). Such injuries compromise both individual performance and squad continuity.

Premature or non standardized return to play (RTP) decisions further increase these risks. In many environments, RTP progression relies on subjective assessments and fragmented communication among medical, rehabilitation, and performance staff, leading to inconsistent decisions. This lack of integration heightens the likelihood of incomplete recovery, reinjury, and suboptimal performance upon return to training or competition (6,7). These challenges underscore the need for clearer, criterion based structures that integrate medical, functional, physical, and technical–tactical considerations within a unified interdisciplinary framework.

Recent literature highlights multidimensional, criterion based RTP approaches that integrate biomechanical, physiological, neuromuscular, and performance metrics to guide progression across rehabilitation. Progressive, sport specific models grounded in load tolerance, strength symmetry, neuromuscular control, and technical skill development optimize recovery, reduce reinjury risk, and support a more robust return to performance (5–9). Despite these advances, inconsistencies persist in terminology, phase definitions, and practical implementation across elite football environments. Updated RTP pathways, scoping reviews, and trials evaluating structured on field rehabilitation reinforce the need for consensus driven frameworks that unify evidence based knowledge with applied practice (10–13).

The present framework addresses these gaps by organizing the RTP process into progressive phases that integrate biological, sub biological, functional, and performance considerations. The first component outlines biological and sub biological progression, providing shared understanding of tissue healing context and player status. Subsequent components translate this foundation into functional objectives, progression criteria, and performance oriented tasks that support transparent, reproducible, and context specific decision making. By aligning these dimensions within a single structure, the framework aims to enhance interdisciplinary communication, reduce variability in practice, and promote safer, more effective return to competition strategies in professional soccer.

Building on this foundation, the second component operationalizes each phase through functional objectives and progression criteria. This structure translates biological status into practical, actionable steps for rehabilitation, reconditioning, and performance development, defining what must be restored, how it should be trained, and which criteria must be met before advancing. To enhance clarity and avoid oversized tables, these elements are presented across three phase-specific tables (Tables 2A–2C).

Strength and Power Progression Across RTP Phases

Strength and power progression is phase-specific and aligned with symptom response, mechanical tolerance, and neuromuscular readiness. Early stages prioritize controlled isometrics and low-velocity strength to restore force production and movement quality; later stages progressively reintroduce eccentric overload, plyometrics, and maximal-velocity actions to meet football demands and reduce reinjury risk. Table 3 provides practical loading and sequencing guidelines across phases (14–16).

Table 1. RTP Framework Overview: Structural and Progression Components.

Injury State	Functional Phase	Player Status	Player Status	Description Biological Phase	Sub-biological Phases
Pre-Injury	Baseline Monitoring (BM)	Full Participation	Fully integrated into team activities, no restrictions. Load, intensity, and specificity aligned with positional and conditional profile for optimal performance.	Homeostasis	Neuromuscular Efficiency / Optimal Mechanical Load Tolerance
Injury Onset (Sudden or gradual limitation)				Destruction	Structural disruption / Microtrauma / Acute Inflammatory Activation
During-Injury	Return to Function (RTF)	Differentiated	Fully removed from team training; focused on early rehabilitation. Priority on restoring basic function and preserving health. Individualized controlled tasks with strictly limited load and movement exposure.	Inflammation	Vascular Response / Immune Activation / Pain and Edema Modulation
	Return to Train (RTT)	Limited	Individualized controlled physical and technical tasks with predefined load and movement restrictions. Focuses on restoring general physical capacities, restores lost functions, and maintains unaffected capacities.	Proliferation	Angiogenesis / Fibroplasia / Early Collagen Synthesis / Progressive Mechanical Load Tolerance
	Return to Sport (RTS)	Partial	Selected group and sport-specific drills with progressive load, intensity, and complexity. Maintains limitations with compensatory/ supplementary work while keeping sport-specific exposure low; load monitored.	Remodeling	Fiber Realignment/ Collagen Organization/ Neuromuscular Reactivation
		Full Participation (Reduced Volume)	Fully reintegrated in all training activities. Volume reduced to taper and adapt to medium-to-high specific load exposure, emphasizing the integration of intensity, density, and task complexity consistent with positional requirements, while monitoring fatigue.	Functional Reintegration	Sport-Specific Integration / Fatigue Resistance / Collagen Structural Consolidation
Post-Injury		Full Participation (Unrestricted)	Unrestricted training tasks. Focus on load consolidation, monitoring fatigue, and verifying readiness for competition.	Maturation	Sport-Specific Optimization / Load Efficiency / Neuromuscular Coordination
	Return to Competition (RTC)	Match Available (Gradual Exposure)	Cleared for competition with controlled exposure (minutes and load managed). Focus on functional consolidation and ongoing risk monitoring.	Functional Consolidation	Sport-Specific Performance / Movement Efficiency / Injury Risk Modulation
		Match Fit (Unrestricted)	Sustains high-level competition with preventive strategies, structured load management, and continuous monitoring to prevent relapses and optimize long-term performance. Complementary/supplementary high-intensity variables included according to players profile	Homeostasis	Neuromuscular Reinforcement / Structural Maintenance / Long-Term Load Regulation

Notes: Phase transitions are criterion-based and should be adapted according to injury type, severity, tissue involved, athlete response, positional demands, and level of detraining. The injury phase and duration of inactivity determine the entry point within the framework. Progression is guided by pain-free execution, progressive load tolerance, and neuromuscular readiness. Load and movement exposure should be continuously monitored and individualized. Although developed primarily for lower-limb injuries, the framework may be adapted to other injury types in professional soccer.
Abbreviations: BM = Baseline Monitoring; RTF = Return to Function; RTT = Return to Train; RTS = Return to Sport; RTC = Return to Competition.

Table 2A. Phase-Specific Objectives and Progression Criteria: Baseline Monitoring and Return to Function.

Functional Phase	Player Status	Objectives	Criteria Progression
Baseline Monitoring (BM)	Full Participation	1. Identify peak physical performance and pre-injury load. 2. Conduct a retrospective review of injury mechanism (direct, indirect, non-contact), intrinsic/extrinsic risk factors.	1. Baseline values documented, positional load profiles established. 2. Preventive measures identified and risk factors addressed by interdisciplinary team.
Injury Onset (Sudden or gradual limitation)		1. Imaging (MRI/US) at $\geq$ 48 h post-injury, with follow-up $\sim$72 h if clinically indicated. Complement with ongoing manual clinical assessment to monitor pain, tissue response, ROM, and readiness for progression. 2. Control pain and inflammation (POLICE), establish pain tolerance baseline (NRS). 3. Estimate recovery timeline based on tissue, severity, and context with interdisciplinary team input.	1. Imaging confirms lesion grade and tissue type, complemented by clinical/manual assessment to identify functional limitations (pain, ROM, strength, tissue response). 2. Pain $\leq$ 3/10 (NRS) with inflammation reduction. 3. Recovery plan established and communicated to player and staff.
Return to Function (RTF)	Differentiated	1. Restore joint mobility and functional movement with progressive flexibility and proprioception. 2. Initial Strength & Neuromuscular Control Development: Early Isometrics on Treatment Table $\rightarrow$ Bodyweight Isometrics (light $\rightarrow$ moderate, bilateral) $\rightarrow$ Controlled Isotonic (CKC $\rightarrow$ OKC), emphasizing stabilizers, adjacent/complementary muscles, and cross-education. 3. Foundational Conditioning with adaptable, pain-free aerobic work (alternative no- to low-impact modalities).	1. Safe ROM and functional movement achieved. 2. Neuromuscular activation restored with pain $\leq$ 3/10 (NRS). 3. Cardiovascular sessions performed with pain 0/10 (NRS) at moderate intensity (RPE $\sim$5/10).
	Clearance for Individual Training (RTT)		

Notes: The Return to Train phase focuses on the progressive reintroduction of physical, technical, and multidirectional demands under controlled conditions. Progression should be guided by pain-free execution, absence of reactive symptoms, and tolerance to increasing mechanical and neuromuscular load. Strength and movement complexity advances from bilateral to unilateral tasks, and from linear to COD-based programmed actions, while maintaining close monitoring of fatigue and movement quality.
Abbreviations: RTT = Return to Train; COD = Change of Direction; HIIT = High-Intensity Interval Training; SI = Short Intervals; SSC = Stretch–Shortening Cycle; IFT = Intermittent Fitness Test; VIFT = final running speed reached in the 30–15 Intermittent Fitness Test (30–15 IFT); NRS = Numeric Rating Scale; acc–dec = accelerations/decelerations.

HIIT Progression Across RTP Phases

HIIT progresses from foundational conditioning toward individualized high-intensity formats such as running tolerance and neuromuscular load capacity recover. Intermittent fitness testing (e.g., the 30–15 Intermittent Fitness Test) can be used to individualize prescription by anchoring intensity to VIFT (final running speed achieved in the test) and by informing the selection of work–rest structures and total volume across phases (17), while later stages integrate accelerations, decelerations, and sport-specific constraints to replicate competition demands. Table 4 summarizes recommended progressions across phases (17–19).

Soccer-Specific Tasks and Specificity Progression

Soccer-specific exposure should increase representativeness by manipulating contextual, informational, and tactical constraints, progressing from individual technical work to group drills and game-like situations. This progression increases both intensity and complexity and helps bridge the gap between rehabilitation and match demands. Table 5 provides a phase-aligned pathway for increasing task specificity across RTT–RTS–RTC (9,20,22).

Integrated RTP Framework and Decision Making

We synthesize the framework into a visual model that integrates the structural components from Table 1 with the operational criteria from Tables 2A-2C. Figure 1 provides a high-level representation of how biological status, functional progression, and performance domains interact across the RTP continuum.

RTP decisions are strengthened when evidence-based principles are integrated with practice-based monitoring, enabling individualized progression while maintaining transparent interdisciplinary alignment. Figure 2 summarizes this decision-making approach.

Table 2B. Phase-Specific Objectives and Progression Criteria: Return to Train.

Functional Phase	Player Status	Objectives	Criteria Progression
Return to Train (RTT)	Limited	1. Linear Aerobic Progression (Type 1-Long Intervals) low → moderate + technique drills emphasizing fundamental locomotion mechanics. 2. Progressive Strength & Power Development: Isometrics (medium → high, bilateral → unilateral) → Structural Strength / Strength Endurance with eccentric emphasis (bodyweight → load, bilateral → unilateral, emphasis on eccentric) → Speed–Strength → Power → Strength–Speed → Plyometrics (non-SSC → SSC, extensive → intensive). 3. Second imaging, if clinically indicated to verify tissue organization. 4. Progressive Soccer-Specific Skills and Multidirectional Movement: Control & Passing: Short → medium → long passes, integrated progressively under fatigue. Dribbling: From low to high intensity, incorporating changes of direction (COD). Finishing & Shooting: From precision shooting without opposition → to dynamic, game-like contexts with decision making. Contact Drills: Transition from non-contact → controlled contact situations. COD, Coordination, Acceleration & Deceleration: Progress from programmed, low–moderate intensity tasks → to reactive, high-intensity actions, ultimately integrating resisted COD and acceleration efforts. Integrated Soccer Drills: Combine technical skills within tactical scenarios (decision making). 5. Intermittent fitness assessment (30–15 IFT) & individualized HIIT (Type 3 (SI-linear) → Type 4 (SI–COD).	1. Running progression completed with pain ≤ 3/10 (NRS), no reactive inflammation, and stable mechanics. 2. Strength tolerated pain-free, with progression bilateral → unilateral and no compensations. 3. Imaging (if performed) consistent with expected tissue organization and clinical presentation. 4. Individual soccer tasks completed with controlled movement quality (COD/acc–dec), without symptom exacerbation. 5. 30–15 IFT and VIFT-referenced intervals completed without reactive symptoms, maintaining movement quality and expected recovery response.
	Clearance for Team Integration		

Notes: The Return to Train phase focuses on the progressive reintroduction of physical, technical, and multidirectional demands under controlled conditions. Progression should be guided by pain-free execution, absence of reactive symptoms, and tolerance to increasing mechanical and neuromuscular load. Strength and movement complexity advances from bilateral to unilateral tasks, and from linear to COD-based programmed actions, while maintaining close monitoring of fatigue and movement quality.
Abbreviations: RTT = Return to Train; COD = Change of Direction; HIIT = High-Intensity Interval Training; SI = Short Intervals; SSC = Stretch–Shortening Cycle; IFT = Intermittent Fitness Test; VIFT = final running speed reached in the 30–15 Intermittent Fitness Test (30–15 IFT); NRS = Numeric Rating Scale; acc–dec = accelerations/decelerations.

Discussion

We propose an integrated RTP framework that aligns biological, functional, and performance elements within a clear, progressive structure consistent with the demands of professional soccer. Standardized terminology and phase definitions support criterion-based progression and soccer-specific exposure (5–10), while EBK and PBE integration supports decisions that remain scientifically grounded yet adaptable to individual player responses.

In practice, effective RTP implementation depends on the ability to translate interdisciplinary planning into precise, context driven decision making. Monitoring internal and external load, together with strength, power, and movement quality indicators, provides objective information that supports individualized progression and reduces reinjury risk (11–13, 20, 21). High speed running exposure, positional movement patterns, and soccer specific task demands offer reproducible benchmarks for competition readiness and help minimize reliance on subjective judgment. These operational markers complement the interdisciplinary framework by ensuring that decisions are grounded not only in collective expertise but also in measurable performance outcomes.

By organizing progression around shared terminology and clearly defined criteria, the framework enhances interdisciplinary alignment and reduces ambiguity during the transition from rehabilitation to performance integration. Its structure also facilitates alignment with positional conditional profiles, acute to chronic load considerations, and the competitive calendar, supporting more consistent and transparent decision making.

Although developed for lower limb injuries, the framework is adaptable across injury types, player profiles, and club resources. Its structured progression and objective criteria may also be applied to other sports where detraining of physical and functional capacities occurs (12, 13, 20, 21). Overall, the framework provides a practical, evidence informed structure that supports safe return to competition while promoting long term performance development.

Table 2C. Phase-Specific Objectives and Progression Criteria: Return to Sport and Return to Competition.

Functional Phase	Player Status	Objectives	Criteria Progression
Return to Sport (RTS)	Partial	1. Game-Specific Integration (Individual → Group): Type 2 (VIFT-referenced) COD/acc mechanics → Type 4 (GB) joker → full drills 2. High-Intensity Load Integration (Supplementary Exposures): HSR/sprint top-ups (70–85% max speed) and/or VIFT-referenced SI, positional-profile aligned, based on weekly load gaps and phase tolerance. 3. Advanced Strength & Power Integration (RTS, Partial → Full Group): Fast-Twitch Contractions → High-Load Strength → Overload Eccentric → Overcoming Isometrics (bilateral → unilateral, submaximal → maximal) → Power-Endurance.	1. Positive tissue adaptation; tolerance to sport-specific loads (contact/non-contact). 2. High-intensity efforts safely reproduced; pain $\leq$ 0/10 (NRS). 3. $\geq$ 85% baseline strength, $\leq$ 15% asymmetry.
	Full Participation (Reduced Volume)	1. Tapered Game-Load Adaptation: Type 4 (GB) with reduced total and general volume. 2. Safely approximate the original injury mechanism under controlled conditions. 3. High-Intensity Microdosed Load: maximal-speed exposure and acc/dec microdoses (RST ± SI as needed).	1. Achieve $\geq$ 80% baseline external load values per day and position. 2. Original injury mechanism safely reproduced without pain/fear. 3. Running and neuromuscular efficiency maintained at 90–100% max speed.
	Clearance for Team Training		
	Full Participation (Unrestricted)	1. Third imaging, as a complementary tool, to assess collagen remodeling and tissue maturation. 2. Complete a full team microcycle, restoring conditional profile values and exposing players to near worst-case scenario loads. 3. Advanced Strength & Power (unrestricted).	1. Imaging confirms collagen remodeling and tissue maturation 2. Microcycle completed without pain or inflammation, achieving key positional load targets. 3. Replicate or exceed pre-injury strength benchmarks, bilateral and unilateral.
	Clearance for Progressive Competition Exposure		
Return to Competition (RTC)	Match Available (Gradual Exposure)	1. Progressive match exposure (e.g., 15 → 30 → 45 → 60 → 75 min), starting first minutes as a substitute. 2. Ensure proper recovery between matches by monitoring load undulation and the ACWR.	1. Fatigue and recovery metrics within expected ranges. 2. Clearance obtained for unrestricted competition.
	Clearance for Unrestricted Competition		
	Match Fit (Unrestricted)	1. Maintain optimal load alignment according to positional profile. 2. Manage and control external, internal, and specific loads with supplementary strategies. 3. Individualized prevention programs based on injury history, deficiencies, and areas of improvement.	1. Positional daily load targets achieved safely. 2. High-intensity metrics reproduced without setbacks. 3. Structural integrity preserved.

Notes: Progression through Return to Sport and Return to Competition phases requires demonstrated tolerance to high-intensity, sport-specific, and positional demands. Criteria emphasize restoration of strength symmetry, exposure to maximal and near worst-case scenario loads, and the ability to reproduce match-related actions without pain or functional limitation. Match availability and unrestricted competition clearance should be based on cumulative training tolerance, recovery capacity, and consistent performance metrics across multiple exposures.
Abbreviations: RTS = Return to Sport; RTC = Return to Competition; GB = Game-Based; HSR = High-Speed Running; SI = Short Intervals; RST = Repeated Sprint Training; NRS = Numeric Rating Scale; VIFT = final running speed reached in the 30–15 Intermittent Fitness Test (30–15 IFT); COD = Change of Direction; ACWR = Acute: Chronic Workload Ratio; acc–dec = accelerations/decelerations.

Practical applications

- Provides a clear, progressive structure to guide RTP decisions in professional soccer.
- Integrates biological recovery with functional, technical, and soccer specific performance demands.
- Supports individualized progression using objective metrics (NRS pain reactivity, strength symmetry, GPS load incl. HSR/sprint and max-speed exposure, CMJ, RPE, and VIFT).
- Enhances communication and alignment between medical, rehabilitation, and performance staff.
- Aligns technical, tactical, and physical tasks with positional conditional profiles.
- Promotes progressive exposure to high speed running, change of direction actions, and integrated technical tactical drills.

Limitations

- We developed this framework from applied professional practice; empirical validation is still needed.
- Effectiveness in reducing reinjury risk or enhancing performance has not been tested prospectively.
- Implementation may vary depending on staffing, technology, and club resources.
- Adaptation may be required for different competitive levels or injury types.
- Further research is needed to evaluate specific thresholds and progression criteria.

Table 3. Strength and Power Progression Characteristics Across RTP Phases.

Functional Phase	Player Status	Type of Work	Progression / Sequence	Intensity (Load / Velocity)	Reps / Contraction Times
Return to Function (RTF)	Differentiated	Early Isometrics (Treatment Table)	Unilateral → bilateral	Light / bodyweight	5–15 s holds
		Bodyweight Isometrics	Light → moderate; bilateral stabilization	Bodyweight → light external load	5–30 s holds
		Controlled Isotonics	CKC → OKC; slow tempos	Light → moderate load	8–12 reps; 2–3 s concentric + 2–3 s eccentric
Return to Train (RTT)	Limited	Isometrics	Bilateral → unilateral	Medium → high intensity	5–30 s holds
		Structural Strength / Strength Endurance (eccentric emphasis)	Bodyweight → load; bilateral → unilateral	∼20–40% 1RM	8–15 controlled reps; TUT 3–4 s
		Speed–Strength	Low-load ballistic patterning	20–40% 1RM (≈1.30–1.50 m/s)	Explosive; 5–8 reps
		Power	Moderate load, maximal velocity	40–60% 1RM (≈1.10–1.30 m/s)	3–6 reps
		Strength–Speed	Higher load, moderate velocity	60–80% 1RM (≈0.70–0.90 m/s)	3–5 reps
		Plyometrics	Non-SSC → SSC; extensive → intensive	Bodyweight → light load	Short GCT; 4–8 contacts/series
Return to Sport (RTS)	Partial → Full Group	Fast-Twitch Contractions	Short → longer contraction duration	Medium → high intensity	4–10 s efforts
		High-Load Strength	Submaximal → maximal	80–90% 1RM (≈0.40–0.60 m/s)	2–3 reps
		Overload Eccentric	Bilateral → unilateral; controlled lowering	Moderate → high load	3–5 reps 3–5 s eccentric
		Overcoming Isometrics	Submaximal → maximal	Medium → maximal intensity	3–5 s
		Power-Endurance	Integrated into football-specific circuits	Moderate → high intensity	Short sets; high output

Notes: Values represent general progression guidelines; specific loading, velocity targets, and contraction durations should be individualized based on athlete tolerance, monitoring data, and phase-appropriate RTP criteria.
Abbreviations: RTF = Return to Function; RTT = Return to Train; RTS = Return to Sport; CKC = Closed Kinetic Chain; OKC = Open Kinetic Chain; SSC = Stretch–Shortening Cycle; 1RM = one-repetition maximum; TUT = Time Under Tension; GCT = Ground Contact Time.

Notes: Phase progression within the RTP framework is criterion-based and individualized, rather than time-dependent. Transitions between phases require pain-free execution, adequate neuromuscular control, and tolerance to progressively specific external and internal loads. Biological phases are presented to contextualize functional progression and should not be interpreted as fixed timelines. Clearance decisions are informed by continuous load monitoring, functional readiness, and interdisciplinary staff agreement.
Abbreviations: BM = Baseline Monitoring; RTF = Return to Function; RTT = Return to Train; RTS = Return to Sport; RTC = Return to Competition.

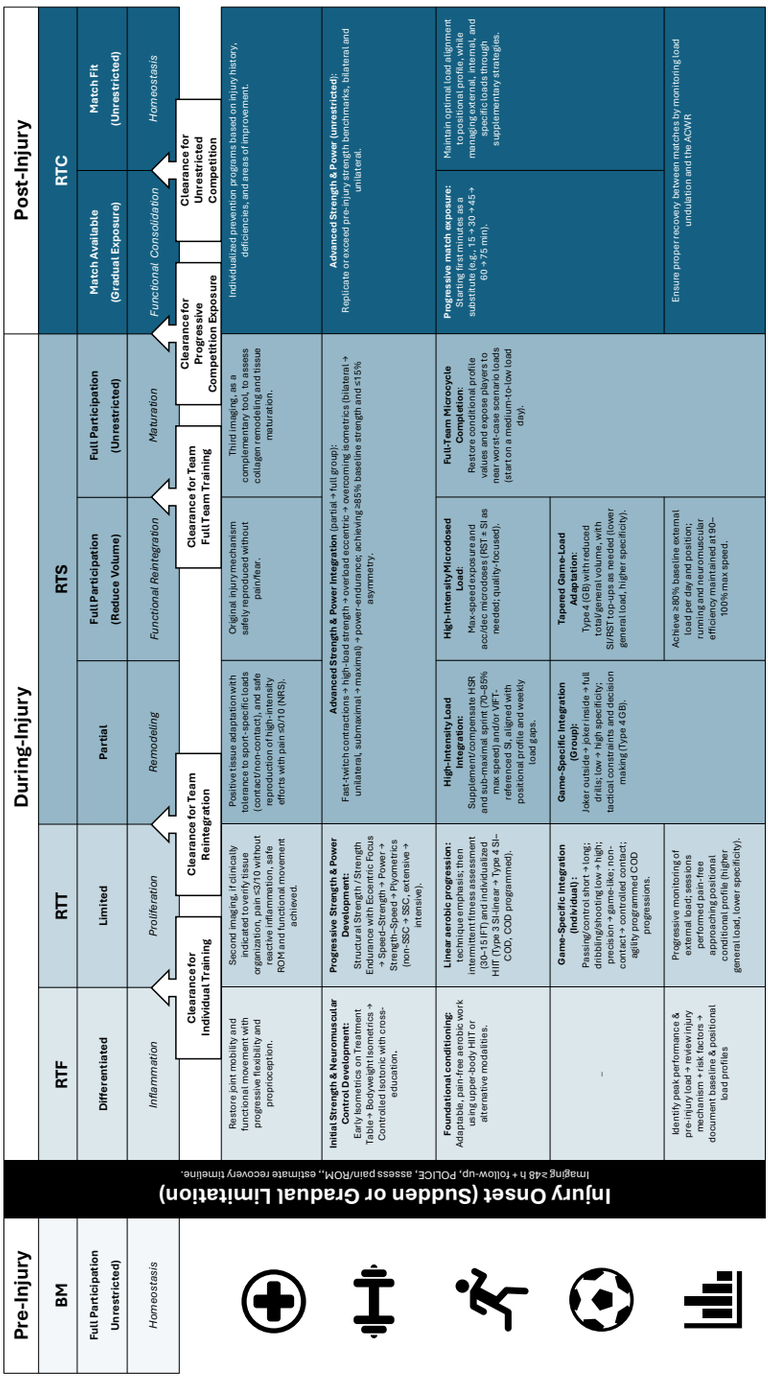

Fig 1. Integrated RTP Continuum Across Biological, Functional, and Performance Domains

Notes: Adapted from French and Torres-Ronda (23). Abbreviations: EBK = Evidence-Based Knowledge; PBE = Practice-Based Evidence; RTP = Return to Play.

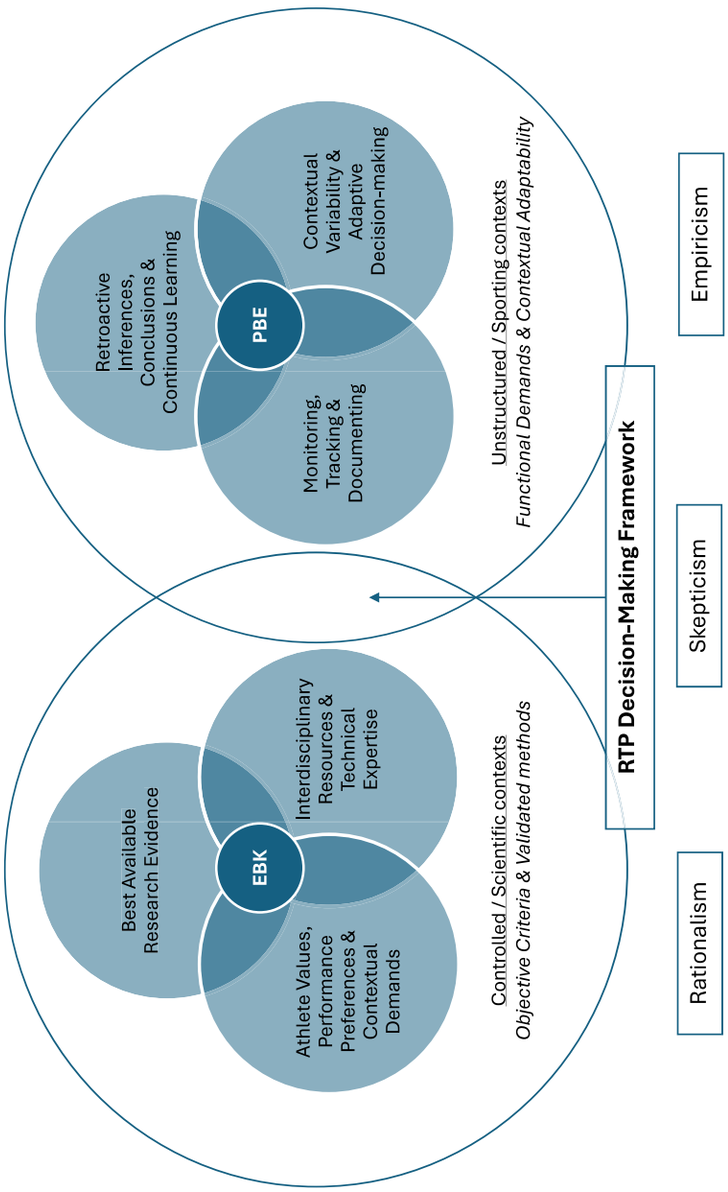

Fig 2. RTP Decision Making Framework

Table 4. HIIT Progression Characteristics Across RTP Phases.

Functional Phase	Player Status	Type of Conditioning	Progression / Sequence	Intensity (Reference)	Duration / Work:Rest
Return to Function (RTF)	Differentiated	Foundational Conditioning	Upper-body intervals → pool-based (aquatic) conditioning → bike → elliptical → Anti-gravity treadmill running; tolerance-based, gradual volume increase	RPE ∼5/10	Continuous: 5–15 min Intervals: 15–30 s work: 15–30 s rest (1:1)
Return to Train (RTT)	Limited	Linear Aerobic Progression	Type 1 (LI) Linear running progression: volume → density → velocity; emphasis on movement quality	LI continuous: 60–75% LI intervals: 80–90% VIFT	Continuous: 5–15 min Intervals: >60 s work: 1–3 min rest / active rest 2–4 min (45–60% VIFT)
		Intermittent Fitness Assessment & Individualized HIIT	Type 3 (SI-linear) → Type 4 (SI–COD): extensive → intensive (30–15, 30–30, 15–30, 15–15; linear run-based)	90–105% VIFT	<60 s work: <60 s rest (1:1; 1:0.5; 1:2)
Return to Sport (RTS)	Partial	Game-Specific Integration (Individual Tasks)	Type 2 (Integrated; VIFT-referenced) Low → moderate metabolic demand with progressively higher neuromuscular intensity (COD, acceleration mechanics, technical skill under fatigue)	50–70% VIFT	15–45 s work: 1–4 min rest (1:1 to 1:4)
		Game-Specific Integration (Group Tasks)	Type 4 (GB) Joker outside → joker inside → full drill exposure; tactical constraints and decision making	70–90% VIFT	2–4 min work: 2–4 min rest (1:1)
		High-Intensity Load Integration (Supplementary Exposures)	Supplement/compensate HSR and sub-maximal sprint (positional-profile aligned) and/or VIFT-referenced SI, based on weekly load gaps and phase tolerance	70–85% max speed and/or 90–100% VIFT (as needed)	3–10 s work: 60–120 s rest (quality-focused) and/or <60 s: <60 s
	Full Participation (Reduced Volume)	Tapered Game-Load Adaptation	Types 3–4 (SI, RST, GB) High specificity with reduced volume; microdosed accelerations, decelerations, HSR	SI: 90–105% VIFT RST: 70–80% → 80–90% max speed GB: 70–80% VIFT	SI: <60 s: <60 s RST: 3–10 s: 45–90 s GB: 2–4 min: 2–4 min
	Full Participation (Unrestricted)	High-Intensity Microdosed Load	Types 3–4 (RST) Max-speed exposure; repeated accelerations/decelerations; controlled exposure to injury mechanism	80–95% max speed + ≥95% max-speed exposures (microdosed)	3–10 s work: 45–90 s rest

Notes: Values represent general HIIT progression guidelines; specific intensity targets, work-to-rest ratios, and conditioning modes should be individualized according to athlete tolerance, daily readiness, movement quality, and phase-appropriate RTP criteria.
Abbreviations: RTF = Return to Function; RTT = Return to Train; RTS = Return to Sport; HIIT = High-Intensity Interval Training; RPE = Rate of Perceived Exertion; LI = Long Intervals; VIFT = final running speed reached in the 30–15 Intermittent Fitness Test (30–15 IFT); SI = Short Intervals; COD = Change of Direction; GB = Game-Based; HSR = High-Speed Running; RST = Repeated Sprint Training.

Table 5. Soccer Specific Task Progression and Specificity Levels Across RTP Phases.

Functional Phase	Player Status	Progression Stage
Return to Train (RTT)	Limited	Individual Technical Drills:
Return to Sport (RTS)	Partial (joker outside) → (joker inside) → (full drill)	Collective Passive Drills
		Rondos
		Small-Sided Games (SSG)
		Medium-Sided Games (MSG)
	Full (reduced volume) → Full (unrestricted)	Crossing & Finishing
		Duels with Finishing
		Large-Sided Games (LSG)
		Transition Games
		Reduced Games
Return to Competition (RTC)	Match Available (Gradual Exposure) → Match Fit (Unrestricted)	Friendly Games
		Official Match

Notes: Progression is criterion-based and individualized according to injury characteristics, player response, positional demands, and tolerance to load.

Conflicts of interest

The authors declare no conflicts of interest.

Data availability statement

No dataset was generated or analyzed for this technical note.

References

1. López Valenciano A, Ruiz Pérez I, Garcia Gómez A, Aparicio Sarmiento A, De Ste Croix M, Oliver JL, et al. Epidemiology of injuries in professional football: a systematic review and meta-analysis. Br J Sports Med. 2020;54(12):711–718.

2. Lundblad M, Hägglund M, Thomeé C, Hamrin Senorski E, Ekstrand J, Karlsson J, Waldén M. Epidemiological data on LCL and PCL injuries over 17 seasons in men's professional soccer: the UEFA Elite Club Injury Study. Open Access J Sports Med. 2020;11:105–112.

3. Robles Palazón FJ, García Gómez A, López Valenciano A, Ayala F, De Ste Croix M, Vera García FJ, et al. Epidemiology of injuries in male and female youth football players: a systematic review. Int J Environ Res Public Health. 2021;18(16):8661.

4. Ekstrand J, Krutsch W, Spreco A, van Zoest W, Roberts C, Meyer T, Bengtsson H. Time before return to play for the most common injuries in professional football: a 16 year follow up of the UEFA Elite Club Injury Study. Br J Sports Med. 2020;54(7):421–427.

5. Stathas I, Arampatzis A, et al. Effectiveness of an on-field rehabilitation framework in professional football. BMJ Open Sport Exerc Med. 2024;10(1):e001849.

6. Saniel G, Buchheit M. Gravity off, game on: accelerating recovery and running load readiness in elite football. Sport Performance & Science Reports. 2025;246.

7. Dalen-Lorentsen T, Ranvik A, Bjørneboe J, et al. Facilitators and barriers for implementation of a load management intervention in football. BMJ Open Sport Exerc Med. 2021;7:e001046.

8. Haller N, Blumkaitis JC, Strepp T, et al. Comprehensive training load monitoring with biomarkers, performance testing, local positioning data, and questionnaires in elite youth soccer. Front Physiol. 2022;13:1000898.

9. Camenforte I, Casamichana D, Cos F, Castellano J, Fernández J. Diseño y validación de una herramienta de valoración del nivel de especificidad de las situaciones simuladoras preferenciales en fútbol. RICYDE. 2023;19(75):1–12.

10. Ricupito R, Grassi A, Mourad F, Di Filippo L, Gobbo M, Maselli F. Anterior Cruciate Ligament Return to Play: "A Framework for Decision Making". J Clin Med. 2024;14(7):2146.

11. Perna P, Kerin F, Greig N, Beato M. Return to play criteria following a hamstring injury in professional football: a scoping review. Res Sports Med. 2024.

12. Van der Horst N, Backx FJG, Goedhart EA, Huisstede BMA. Return to play after hamstring injuries in football (soccer): a worldwide Delphi procedure. Br J Sports Med. 2017;51(22):1583–1591.

13. Musahl V, Karlsson J, Krutsch W, Mandelbaum BR, Espregueira Mendes J, d'Hooghe P. Return to Play in Football: An Evidence based Approach. Springer; 2018.

14. Buckthorpe M, Della Villa F. Optimising the "mid-stage" training and testing process after ACL reconstruction. Sports Med. 2021;51(4):657–678.

15. Taberner M, Cohen DD. Physical preparation of the football player returning from injury. Int J Sports Physiol Perform. 2020;15(6):821–828.

16. Bishop C, Read P, Chavda S, Turner A. Asymmetries of the lower limb: implications for strength training and rehabilitation. Br J Sports Med. 2021;55(10):560–561.

17. Laursen PB, Buchheit M. Science and Application of High-Intensity Interval Training. Champaign, IL: Human Kinetics; 2019.

18. Buchheit M. Structuring the daily progression from return-to-run to full team integration. Sports Perform Sci Rep. 2025; 251:1-12.

19. Buchheit M, Laursen PB. High-intensity interval training, solutions to the programming puzzle. Part II: anaerobic energy, neuromuscular load and practical applications. Sports Med. 2013;43(10):927-954.

20. Martínez Ruiz EA, Lago Fuentes C, Barcala Furelos M. Cuantificación de especificidad en un microciclo estructurado en fútbol profesional. RICYDE. 2022;18(69):180–190.

21. Seirul·lo Vargas F. La preparación física en los deportes de equipo: una visión estructurada. Barcelona: INEFC; 2017.

22. Modelación táctica del juego y complejidad en deportes colectivos. Rev Port Cien Desporto. 2009;9(1):81–89.

23. French D, Torres Ronda L, editors. NSCA's Essentials of Sport Science. Champaign (IL): Human Kinetics; 2022. 576 p.